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(54) OIL-IN-WATER EMULSIFIED PRODUCT

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain an oil-in-water emulsified product containing phytosterol and/or phytosterol fatty acid ester each having cholesterol absorption inhibitory action, and having stable oil-in-water emulsification for a long period of time and excellent flavor and palate feeling, and suitable especially as an acid oil-in- water emulsified product, such as mayonnaise and dressing.

SOLUTION: This oil-in-water emulsified product is obtained by incorporating therein phytosterol and/or phytosterol fatty acid ester and yolk processed with an enzyme.

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CLAIMS

[Claim(s)]
[Claim 1] The oil-in-water type emulsification object characterized by plant sterol and/or plant sterol fatty acid ester, and containing the enzyme processing yolk.
[Claim 2] The oil-in-water type emulsification object according to claim 1 which contains plant sterol and/or plant sterol fatty acid ester 0.1 to 40% of the weight by plant sterol conversion.
[Claim 3] The oil-in-water type emulsification object according to claim 1 or 2 which contains the enzyme processing yolk one to 15% of the weight.
[Claim 4] An oil-in-water type emulsification object given in any of claims 1-3 which are the enzyme processing yolks obtained when the enzyme processing yolk processed the yolk by HOSUFO lipase A and the protease they are.
[Claim 5] An oil-in-water type emulsification object given in any of claims 1-4 which are acid oil-in-water type emulsification objects they are.
[Claim 6] The manufacture approach of the oil-in-water type emulsification object characterized by emulsifying the oil phase containing plant sterol and/or plant sterol fatty acid ester, and the aqueous phase containing the enzyme processing yolk.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] Especially the oil-in-water type emulsification object of this invention is suitable as acid oil-in-water type emulsification objects, such as mayonnaise and a dressing, about the oil-in-water type emulsification object with which this invention contains plant sterol and/or plant sterol fatty acid ester.

[0002]
[Description of the Prior Art] It is known by plant sterol and plant sterol fatty acid ester for many years that the absorption depressant action of the cholesterol from a small intestine occurs, and it is used for them as a plasma cholesterol concentration fall agent. Absorption of cholesterol requires that cholesterol should dissolve in a bile acid micell. However, the amount of dissolutions to the bile acid of cholesterol is low, and most is in the condition of an emulsion.
[0003] On the other hand, an amount almost comparable as cholesterol also dissolves plant sterol and plant sterol fatty acid ester in a bile acid micell. Therefore, when cholesterol and plant sterol live together, the amount of dissolutions to the bile acid micell of cholesterol will decrease. Moreover, the absorption coefficient from the small intestine of plant sterol is low, since it remains in a small intestine lumen, the amount of dissolutions to the bile acid micell of cholesterol becomes [being restricted with as, and], and absorption of cholesterol will be controlled. Therefore, in the case of the Homo sapiens who is easy to be influenced of the cholesterol taken in from a meal, plant sterol and plant sterol fatty acid ester are clinically used as an effective plasma cholesterol fall agent.
[0004] That amount is very few, although this plant sterol and plant sterol fatty acid ester are contained in vegetable oil and fat, an soybean, wheat, etc. and it is taken in with the everyday meal. If a current Japanese's eating habits are looked at, in order to control absorption of the cholesterol from a meal, day about 1-2g [per] plant sterol is required of plant sterol conversion, and it is difficult to take in a lot of such plant sterol and plant sterol fatty acid ester with the usual Homo sapiens's meal. It considers as

the approach of taking in efficiently the plant sterol which has such a function, and plant sterol fatty acid ester, and although the various food which used plant sterol and plant sterol fatty acid ester is proposed, the following is mentioned as a patent about an oil-in-water type emulsification object.

[0005] Although the food product based on a fat which is within the limits whenever [esterification / of a sterol / whose] are 40 thru/or 90% is proposed by JP,11-127779,A and oil-in-water type emulsification objects, such as mayonnaise and a dressing, are mentioned to it as this food product including at least 1% of the weight of the sterol equivalent, it is limited to the low oil dressing whose fat is about 33%, and is hard to say that emulsion stability is enough.

[0006] the [moreover, / international public presentation] -- in a No. 99/48378 official report, the fats-and-oils constituent which made the fats and oils which contain diacylglycerol 15% of the weight or more dissolve thru/or distribute plant sterol 1.2 to 20% of the weight proposes -- having -- as this fats-and-oils constituent -- a dressing, mayonnaise, and roast meat -- hanging down -- etc. -- although the oil-in-water type emulsification object is mentioned -- this oil-in-water type emulsification object -- emulsion stability -- enough -- **** -- it is hard to say.

[0007] Furthermore, although the salad dressing which has sterol ester, an emulsifier or hydrocolloid, and a fat crystal inhibitor, and its manufacture approach are proposed by JP,2000-127779,A, since a lot of emulsifiers and hydrocolloids for emulsification stabilization are blended, there is a problem that flavor and mouthfeel are bad.

[0008] Therefore, the purpose of this invention is an oil-in-water type emulsification object containing the plant sterol which has cholesterol absorption depressant action, and/or plant sterol fatty acid ester, and offering an oil-in-water type emulsification object especially suitable as acid oil-in-water type emulsification objects, such as mayonnaise and a dressing, with stably sufficient flavor and stably sufficient mouthfeel has oil-in-water type emulsification for a long period of time.

[0009]

[Means for Solving the Problem] this invention persons did the knowledge of the ability to attain the above-mentioned purpose by combining the enzyme processing yolk with plant sterol and/or plant sterol fatty acid ester as an emulsifier, as a result of repeating examination wholeheartedly that the above troubles about acid oil-in-water type emulsification objects, such as an oil-in-water type emulsification object containing plant sterol and/or plant sterol fatty acid ester especially mayonnaise, and a dressing, should be solved.

[0010] This invention was made based on the above-mentioned knowledge, and offers the oil-in-water type emulsification object characterized by plant sterol and/or plant sterol fatty acid ester, and containing the enzyme processing yolk.

[0011]
[Embodiment of the Invention] Hereafter, the oil-in-water type emulsification object of this invention is explained to a detail. The plant sterol used by this invention is a component which constitutes a vegetable cell membrane, and exists widely in vegetation. For example, there are some which made the origin legumes, such as seeds, such as cereals, such as corn and wheat, and Goma, and an soybean, the rapeseed, the coconut, and the cottonseed. Moreover, all can be used although there is plant stanol, such as plant sterol, such as beta sitosterol, campesterol, a BURASHIKA sterol, fucosterol, and an ergosterol, and beta-sitostanol, campestanol, in plant sterol.
[0012] Moreover, as plant sterol fatty acid ester, a ****** rare ****** ester object, the plant sterol fatty-acid-ester content fats and oils obtained by carrying out the esterification reaction of the above-mentioned plant sterol, a partial glyceride, and/or a triglyceride which are mentioned later under a non-solvent, using lipase or alkali as a catalyst are used for vegetation.
[0013] Although especially the fatty acid that constitutes the above-mentioned plant sterol fatty acid ester is not limited, the saturated fatty acid and/or unsaturated fatty acid of carbon numbers 4-24 are mentioned preferably, its saturated fatty acid and/or unsaturated fatty acid of carbon numbers 16-24 are [among these] desirable, and its unsaturated fatty acid of carbon numbers 16-24 is still more desirable.
[0014] The above-mentioned plant sterol fatty-acid-ester content fats and oils are explained further below. As the above-mentioned partial glyceride used for manufacture of the above-mentioned plant sterol fatty-acid-ester content fats and oils, a reaction monoglyceride, a distillation monoglyceride, diglyceride, the diglyceride extracted from natural fats and oils are mentioned.
[0015] moreover, as the above-mentioned triglyceride used for manufacture of the above-mentioned plant sterol fatty-acid-ester content fats and oils For example, the fats and oils with which a configuration fatty acid consists of the saturated fatty acid or unsaturated fatty acid of carbon numbers 4-24, concrete -- palm oil and a palm -- the palm system fats and oils of the melting point section in an olein super olein palm stearin palm -- The Rau Lynne system fats and oils, SAL fat, and Xia fat, such as soybean oil, soybean salad oil, oleum rapae, rapeseed salad oil, cotton seed oil, cottonseed salad oil, safflower oil, a sunflower oil and high OREIKKU safflower oil, and a high OREIKKU sunflower oil, corn oil, rice bran oil, palm kernel oil, palm oil - Natural oil fat, such as mango fat, cacao butter, beef tallow, lard, fish oil, whale oil, and milk fat, Synthetic oil fat, such as diglyceride and MCT (medium-chain-fatty-acid triglyceride), and the fats and oils which performed physical or chemical preparation, such as these hardened oil, a judgment oil, or an ester interchange, further can be used combining independence or two sorts or more. In these, it is desirable to use preferably 30 % of the weight or more and the thing contained 50% of the weight or more most preferably 45% of the weight or more still more preferably

for the unsaturated fatty acid of carbon numbers 16-24 as a configuration fatty acid of the fats and oils to be used.
[0016] One sort chosen from a glycerol, fatty-acid lower alcohol ester, and a fatty acid according to the need other than the above-mentioned partial glyceride and/or a triglyceride or two sorts or more may be used. As the above-mentioned fatty-acid lower alcohol ester, although there is especially no limit, as for a fatty-acid part, what is the saturation or the unsaturated fatty acid of the saturation of carbon numbers 4-24 or unsaturated fatty acid, especially carbon numbers 16-24 is desirable, and an alcoholic part has that desirable whose boiling point of the alcohol of isolation is lower alcohol 100 degrees C or less when [, such as ethanol and a methanol,] it hydrolyzes. Moreover, although there is especially no limit also as the above-mentioned fatty acid, it is desirable to use the saturation or the unsaturated fatty acid of the saturation of carbon numbers 4-24 or unsaturated fatty acid, especially carbon numbers 16-24.
[0017] When using lipase as a catalyst in the above-mentioned esterification reaction, although especially the class is not restricted, as this lipase, it is desirable to use a thing without site selectivity. Specifically, it is Alcaligenes. A group and Chromobacterium A group and Pseudomonas The enzyme obtained from a group and a Humicola group is desirable, and it is Alcaligenes in this. A group and Chromobacterium A group and Pseudomonas The enzyme obtained from a group is still more desirable, and it is Alcaligenes. The enzyme obtained from a group is the most desirable. These enzymes may be fixed and used for support, such as the diatom earth, an alumina, ion exchange resin, activated carbon, and a ceramic, although it is also possible to use it with enzyme powder.
[0018] Moreover, when using lipase as a catalyst, since it makes hydrolysis of a reaction oil as low as possible that it is 500 ppm or less still more preferably and it can make low preferably 900 ppm or less of loss at a deordorization process, the moisture content of the system of reaction of the above-mentioned esterification reaction is desirable. Moreover, the above-mentioned esterification reaction can be performed under the conditions of ordinary pressure or reduced pressure.
[0019] Moreover, when using alkali as a catalyst in the above-mentioned esterification reaction, as this alkali, it is desirable to use a sodium methylate. When using a sodium methylate as a catalyst, after heating mixture with plant sterol, a partial glyceride, and/or a triglyceride at 80-100 degrees C and dehydrating to the moisture of 500 ppm or less, it is good to add a catalyst (sodium methylate) and to react under ordinary pressure or reduced pressure. Acids, such as a citric acid and a phosphoric acid, neutralize after esterification reaction termination, and rinsing and dehydration are performed. In addition, those who used lipase as a catalyst in this invention are [using alkali rather than] efficient and economical.
[0020] Moreover, when performing the above-mentioned esterification reaction by making above-mentioned lipase or alkali into a catalyst,

it is desirable to perform a random ester interchange. Since plant sterol is esterified at random with a partial glyceride and/or the configuration fatty acid of TORIGURISEDO by performing a random ester interchange, the configuration fatty acid composition of plant sterol fatty acid ester and the configuration fatty acid composition of a triglyceride become the same substantially.

[0021] Solvents, such as a hexane and an acetone, or dry type judgment may remove the plant sterol of isolation from the plant sterol fatty-acid-ester content fats and oils obtained as mentioned above.

[0022] Moreover, plant sterol fatty-acid-ester content fats and oils are refined by the purification approach of the usual fats and oils, and the same approach. The purification approaches of the usual fats and oils here are bleaching and deordorization or deoxidation, bleaching, and deordorization. By refining, a smell peculiar to plant sterol is lost and flavor and the good plant sterol fatty-acid-ester content fats and oils of a color tone are obtained.

[0023] Although the plant sterol in the oil-in-water type emulsification object of this invention and/or especially the content of plant sterol fatty acid ester are not restricted, it is preferably good to consider as 1 - 20 % of the weight most preferably 0.5 to 30% of the weight still more preferably 0.1 to 40% of the weight at plant sterol conversion. If this content exceeds 40 % of the weight, mouthfeel of the oil-in-water type emulsification object obtained will become bad, and when this content takes in an oil-in-water type emulsification object at less than 0.1 % of the weight, on the other hand, a cholesterol fall operation will not fully be demonstrated.

[0024] In the oil-in-water type emulsification object of this invention, plant sterol and plant sterol fatty acid ester may be used independently, respectively, and you may use together. when using together, plant sterol (A) and especially weight ratio A/B with plant sterol fatty acid ester (B) limit -- not having -- for example, within the limits of 1000 / 1 - 1/1000 -- desirable -- 30 / 1 - 1/200 -- what is necessary is just to use it still more preferably within the limits of 10 / 1 - 1/30

[0025] In addition to above-mentioned plant sterol and/or plant sterol fatty acid ester, the oil-in-water type emulsification object of this invention contains the enzyme processing yolk. If the yolk which is not processed with an enzyme is used, the emulsion stability of the oil-in-water type emulsification object obtained will become what was remarkably inferior.

[0026] As a substrate for preparing the above-mentioned enzyme processing yolk, fresh egg yellow, the sterilization yolk, the salting yolk, and the sugar-added yolk can be used. Moreover, in order to reduce the cholesterol in an oil-in-water type emulsification object, it is good also considering the yolk which reduced cholesterol as a substrate. Especially if it takes into consideration suppressing growth of the flavor of the oil-in-water type emulsification object obtained and the microorganism at the time of an enzyme reaction, the salting yolk is especially suitable, and

it is good for using the salting yolk with which salt was added three to 20% of the weight to use the salting yolk with which salt was added five to 8% of the weight at best still more preferably.
[0027] In this invention, it is desirable to use together HOSUFO lipase A and a protease as an enzyme used in the case of enzyme processing of the yolk.
[0028] It is the enzyme which carries out the catalyst of the reaction which the above-mentioned HOSUFO lipase A is also called phospholipid hydrolase,. and decomposes phospholipid into lysophospholipid. In this invention By the difference in the location of an ester bond which acts, two kinds, HOSUFO lipase A1 (EC3.1.1.32) and HOSUFO lipase A2 (EC3.1.1.4), can be used. for example, the optimal pH which made the origin the microorganism (for example, Aspergillus oryzae group) -- HOSUFO lipase A1 of an acid range the optimal pH which made pancreatic juice of the mammals, such as a pig, the origin -- HOSUFO lipase A2 of a weak base genital area etc. -- commercial HOSUFO lipase A can be used.
[0029] It is the enzyme which carries out the catalyst of the reaction which understands protein a hydrolyzed part, and by this invention, commercial proteases, such as what made vegetation, the animal, and the microorganism the origin, for example, the bromelain which made the pineapple the origin, a papain which made the papaya the origin, a trypsin which made mammalian pancreatic juice the origin, a pepsin which made mammalian stomach juice the origin, and a protease of the mold origin, can be used for the above-mentioned protease, and especially its bromelain is the optimal.
[0030] As these enzymes, the enzyme of the powder or liquid of the food grade marketed can be used.
[0031] Although HOSUFO lipase A and a protease are the sequence of arbitration or can be added to coincidence in the case of enzyme processing of the yolk, it is desirable to carry out enzyme processing by the protease after the enzyme processing by HOSUFO lipase A from the point of avoiding hydrolysis of the HOSUFO lipase A by the protease.
[0032] The additions of HOSUFO lipase A are a 0.2 - 100 HOSUFO lipase unit and an amount which is still more preferably equivalent to the active mass of 0.5 - 20 HOSUFO lipase unit preferably to 1g of yolks. A HOSUFO lipase unit is a unit showing the active mass of HOSUFO lipase, and 1 HOSUFO lipase unit is an active mass which separates the fatty acid of one micromole in 1 minute after the phospholipid in the yolk, when HOSUFO lipase A is made to act on the yolk at pH8.0 and 40 degrees C.
[0033] The additions of a protease are 0.01 - 10 protease unit and an amount which is still more preferably equivalent to the active mass of 0.1 - 5 protease unit preferably to 1g of yolks. A protease unit is a unit showing the active mass of a protease, and 1 protease unit is an active mass which shows whenever [coloration / which is equivalent to the thyrosin of one micromole in 1 minute], when a protease is made to act on milk casein at pH7.0 and 37 degrees C.
[0034] In addition, the enzyme which consists of concomitant use of

HOSUFO lipase A and a protease may be added on the following criteria. namely, the addition (total quantity) of the above-mentioned enzyme -- the yolk 100 weight section -- receiving -- desirable -- the 0.001 - 0.8 weight section -- it is the 0.01 - 0.3 weight section still more preferably. this time -- the weight ratio of HOSUFO lipase A and a protease -- desirable -- 20 / 80 - 90/10 -- it is 40 / 60 - 85/15 still more preferably.
[0035] Enzyme processing of the yolk is good for the protein, the HOSUFO lipase A, and the protease of the yolk not to denaturalize with heat, but to carry out with the optimum temperature of HOSUFO lipase A and a protease, and usually good to carry [20-60-degree C] out preferably in a 40-55-degree C temperature requirement. Moreover, stirring with an agitator etc. during enzyme processing is desirable.

[0036] Moreover, it is desirable the optimal pH of HOSUFO lipase A and a protease and to usually adjust to the range of pH 3-9 in the case of enzyme processing of the yolk. As a pH regulator of this purpose, especially if it is a food grade, it is not limited, for example, acid, such as acidulants, such as a lactic acid, a citric acid, a gluconic acid, an adipic acid, a succinic acid, a tartaric acid, a fumaric acid, a malic acid, a phosphoric acid, L-ascorbic acid, an acetic acid, and vinegar, a sodium dihydrogenphosphate, a potassium dihydrogenphosphate, vinegar, fruit juice, and fermented milk, a sodium hydroxide and a potassium hydroxide, a calcium hydroxide, a sodium citrate, sodium acetate, disodium hydrogenphosphate the potassium phosphate, phosphoric-acid 3 sodium, sodium ascorbate, etc. can be used. Moreover, calcium salts, such as mineral suitable as a stabilizer of an enzyme, for example, a calcium chloride, and calcium primary phosphate, may be added in the case of enzyme processing of the yolk.
[0037] Although there is especially no constraint in the reaction time in the case of enzyme processing of the yolk, it is desirable to carry out within the limits of 1 - 30 hours. In addition, although the approach of hydrolyzing according to above-mentioned conditions by the batch process as an approach of carrying out enzyme processing of the yolk is adopted, the approach of hydrolyzing with continuous system may be used.
[0038] Extent of the decomposition to the lysophospholipid of the phospholipid of the yolk by HOSUFO lipase A and extent of hydrolysis of the protein of the yolk by the protease are influenced [the addition of an enzyme, reaction temperature, pH at the time of reaction initiation, the existence of the stabilizer of an enzyme, and] of reaction time. Although especially extent of these decomposition is not limited in this invention, the decomposition to the lysophospholipid of the phospholipid of the yolk by HOSUFO lipase A is good to perform 25 - 100% of the total phosphorus lipid contained in the yolk even to extent decomposed into lysophospholipid, and hydrolysis of the protein of the yolk by the protease is good to perform the heating freezing characteristic of the protein contained in the yolk even to extent lost completely.

[0039] Thus, about the obtained enzyme processing yolk, it is good to carry out deactivation of the enzyme used for the enzyme reaction by the suitable approach, for example, heat-treatment.
[0040] The content of the above-mentioned enzyme processing yolk is good to consider as 3 - 12 % of the weight still more preferably one to 15% of the weight preferably among the oil-in-water type emulsification object of this invention from the point which there improves stabilization and flavor, and mouthfeel of oil-in-water type emulsification. The viscosity of the oil-in-water type emulsification object which will be obtained if there are too many these contents rises remarkably, and if there are too few these contents, oil-in-water type emulsification will become unstable.
[0041] As for the oil-in-water type emulsification object of this invention, it is desirable that they are acid oil-in-water type emulsification objects, such as mayonnaise and a dressing.
[0042] The oil-in-water type emulsification object of this invention contains plant sterol and/or plant sterol fatty acid ester, and the enzyme processing yolk as an indispensable component, and although flavor and mouthfeel are good, since it gives mouthfeel and flavor which suited with the oil-in-water type emulsification object made into the purpose, the raw material of the arbitration used for the usual oil-in-water type emulsification mold food can be used for it in the range which does not spoil the purpose of this invention.
[0043] As such a raw material, for example palm oil -- the inside of - palm olein super olein palm stearin palm -- the melting point section, soybean oil, soybean salad oil, oleum rapae, rapeseed salad oil, cotton seed oil, and a cottonseed -- salad oil, safflower oil, a sunflower oil, high OREIKKU safflower oil, and a high OREIKKU sunflower oil - Natural oil fat, such as corn oil, rice bran oil, palm kernel oil, palm oil, SAL fat, Xia fat, mango fat, cacao butter, beef tallow, lard, fish oil, whale oil, and milk fat, Synthetic oil fat, such as diglyceride and MCT (medium-chain-fatty-acid triglyceride), Physical or the fats and oils which performed chemical preparation, such as these hardened oil, a judgment oil, or an ester interchange, furthermore, independence, Or fats and oils, the cane sugar, the lactose, the grape sugar, the fruit sugar, the maltose, the maltooligosaccharide, the isomalt oligosaccharide, the fructo oligosaccharide, the galactosaccharide, the nigero-oligosaccharide, the starch syrup and paratinose trehalose which combined two or more sorts, Saccharides, such as a sorbitol maltitol mannitol, a reduction starch sugar ghost, and poly glucose, Dextrins, such as a straight chain dextrin, a branching dextrin, and an annular dextrin the modified starch and starch which process starch and starch with enzymes, such as an amylase, and are obtained -- receiving -- an acid and alkali treatment -- chemical or the modified starch obtained by performing physical processing, such as - esterification, acetylation, formation of phosphoric-acid bridge formation, heating, and moist heat treatment, -- Furthermore, the modified starch made to become a paste by heat-treatment beforehand so that it may be easy to dissolve these modified starch in water Fresh milk, cow's milk, other

beast milk, condensed milk, sweetened condensed milk, a skimmilk, skimmilk powder, whole milk powder, casein casein sodium rennet casein, milk serum protein, a whey whey powder whey protein concentrate and butter, a buttermilk buttermilk powder cream and concentration cream total milk protein - Dairy products, such as milk calcium cream natural cheese process cheese and fermented milk, Protein, such as egg products, such as a whole egg, the yolk, albumens, and those powder, and soybean protein, gelatin, Various fruit juice, concentrated juice, a dried fruit, vegetable juice, pickles-in-vinegar vegetables, dehydrated vegetables, Seasonings, such as salts, such as refined salt, rock salt, a natural salt, a natural salt, and potassium chloride; and sodium glutamate sodium-succinate inosinic acid soda, a yeast extract, oceanic bonito extractives, HAP-HAV, spirits of wine, xanthan gum pectin locust-bean-gum gellant gum guar gum, and a tare -- thickening stabilizers, such as a gun TOGAMU alginic acid, and sodium alginate curdlan, microfilament-like cellulose methyl cellulose, soybean polysaccharide, a lactic acid, a citric acid, and a gluconic acid -- An adipic acid, a succinic acid, a tartaric acid, a fumaric acid, a malic acid, a phosphoric acid, L-ascorbic acid, Coloring agents, such as acidulants, such as an acetic acid and vinegar, a spice, a spice extract, and beta carotene, Antioxidants, such as a tocopherol, L-ascorbyl stearate, and a L-ascorbic acid palmitic-acid ester tea extract, the charge of bitterness, preservatives, a reinforcement, perfume, etc. are mentioned, and it can be used for arbitration.

[0044] Although an oil-in-water type is made to emulsify in case the above-mentioned raw material is blended with the oil-in-water type emulsification object of this invention since a water-soluble raw material is dissolved in the aqueous phase and an oil solubility raw material is usually dissolved in an oil phase, an oil phase may be made to distribute a water-soluble raw material, and you may emulsify to an oil-in-water type. The oil-in-water type emulsification objects of this invention are [20 - 90 % of the weight of aqueous phase, and 80 - 10 % of the weight of oil phases] 30 - 80 % of the weight of aqueous phase, and 70 - 20 % of the weight of oil phases most preferably still more preferably comparatively preferably [oil phase / the aqueous phase and] 25 - 85 % of the weight of aqueous phase, and 75 - 15 % of the weight of oil phases.

[0045] The oil-in-water type emulsification object of this invention can be manufactured as follows, for example. Plant sterol and/or plant sterol fatty acid ester are made to contain modified starch, a thickening stabilizer, etc. if needed, and it considers as an oil phase, and water is made to contain spices, such as saccharides, such as acidulants, such as vinegar, salt, and a starch syrup, and pepper, the enzyme processing yolk and if needed, and it considers as the aqueous phase. Subsequently, the above-mentioned oil phase is added stirring the above-mentioned aqueous phase, and an oil-in-water type preliminary emulsification object is obtained. This is processed with homogenization machines, such as emulsifiers, such as a colloid mill, and a homogenizer, finishing emulsification is performed, and the

oil-in-water type emulsification object of this invention is obtained.

[0046]

[Example] Next, although an example and the example of a comparison are given and this invention is further explained to a detail, these do not restrict this invention at all.

[0047] (Example 1) HOSUFO lipase A20.015kg (555000 HOSUFO lipase unit) of the pancreatic juice origin of a pig was added to 100kg of salting yolks which adjusted the salting yolk to pH8.2 by the sodium hydroxide 7.5%, it processed at 40 degrees C for 7 hours, subsequently bromelain 0.003kg (90000 protease unit) was added, and it processed at 40 degrees C for 4 hours, it cooled to 5 degrees C, and the enzyme processing yolk (I) was obtained. Next, the water 7.5 weight section, the starch syrup (25 % of the weight of moisture) 4 weight section, the brewing vinegar 4 weight section, the rock salt 2 weight section, the sodium glutamate 0.2 weight section, the mustard seed powder 0.3 weight section, and the above-mentioned enzyme processing (yolk I) 7 weight section were mixed, and the aqueous phase was prepared. The plant sterol 2 weight section was independently dissolved in the heated soybean salad oil 73 weight section, and the oil phase was prepared. Subsequently, the above-mentioned oil phase was added stirring the above-mentioned aqueous phase, the oil-in-water type preliminary emulsification object was obtained, this was emulsified in the colloid mill and the oil-in-water type emulsification object of this invention was obtained. When this oil-in-water type emulsification object was stirred by Spa Chela after 24-hour refrigeration in the 5-degree C refrigerator, destruction of oil-in-water type emulsification was not seen, but emulsification was stable. Moreover, flavor and mouthfeel of this oil-in-water type emulsification object were good.

[0048] (Example 2) Alcaligenes which is lipase without site selectivity after dissolving the plant sterol 10 weight section of the soybean origin in the heated oleum rapae 90 weight section The lipase 1 weight section of the group origin was added, at 65 degrees C, the moisture of the system of reaction was adjusted to 200 ppm, and the ester exchange reaction was performed. Subsequently, lipase was filtered and removed, the clay 2 weight section was added and bleached, it deodorized at the temperature of 200 degrees C, and plant sterol fatty-acid-ester content fats and oils (I) were obtained. The presentations of these fats and oils (I) were 15 % of the weight of plant sterol fatty acid ester, 1 % of the weight of monoglycerides, 12 % of the weight of diglycerides, 71 % of the weight of triglycerides, and 1 % of the weight of unreacted plant sterol. The fatty acid composition of the plant sterol fatty acid ester of these fats and oils (I), a triglyceride, and diglyceride was shown in the following table 1. Next, the oil-in-water type emulsification object of this invention was obtained like the example 1 except having used the above-mentioned plant sterol fatty-acid-ester content fats and oils (I) instead of the oil phase of an example 1. When this oil-in-water type emulsification object was

stirred by Spa Chela after 24-hour refrigeration in the 5-degree C refrigerator, destruction of oil-in-water type emulsification was not seen, but emulsification was stable. Moreover, flavor and mouthfeel of this oil-in-water type emulsification object were good.

[0049] HOSUFO lipase A1 0.02kg (800000 HOSUFO lipase unit) of the Aspergillus oryzae group origin is added to 100kg of salting yolks which added 7kg of water, and 3kg of brewing vinegar to 90kg of salting yolks 8%, and were adjusted to pH4.6. (Example 3) It processed at 45 degrees C for 7 hours, and subsequently bromelain 0.005kg (150000 protease unit) was added, and it processed at 45 degrees C for 3 hours, it cooled to 5 degrees C, and the enzyme processing yolk (II) was obtained. Next, the oil-in-water type emulsification object of this invention was obtained like the example 1 instead of the enzyme processing yolk (I) of an example 1 except having used the above-mentioned enzyme processing yolk (II). When this oil-in-water type emulsification object was stirred by Spa Chela after 24-hour refrigeration in the 5-degree C refrigerator, destruction of oil-in-water type emulsification was not seen, but emulsification was stable. Moreover, flavor and mouthfeel of this oil-in-water type emulsification object were good.

[0050] (Example 4) The same processing as an example 2 was performed after dissolving the plant sterol 10 weight section of the soybean origin in the heated palm olein 90 weight section, and plant sterol fatty-acid-ester content fats and oils (II) were obtained. The presentations of these fats and oils (II) were 14 % of the weight of plant sterol fatty acid ester, 1 % of the weight of monoglycerides, 12 % of the weight of diglycerides, 72 % of the weight of triglycerides, and 1 % of the weight of unreacted plant sterol. The fatty acid composition of the plant sterol fatty acid ester of these fats and oils (II), a triglyceride, and diglyceride was shown in the following table 1. Next, the oil-in-water type emulsification object of this invention was obtained like the example 1 except having used the above-mentioned plant sterol fatty-acid-ester content fats and oils (II) instead of the oil phase of an example 1. When this oil-in-water type emulsification object was stirred by Spa Chela after 24-hour refrigeration in the 5-degree C refrigerator, destruction of oil-in-water type emulsification was not seen, but emulsification was stable. Moreover, flavor and mouthfeel of this oil-in-water type emulsification object were good.

[0051] The water 39.58 weight section, the grape sugar fruit-sugar liquid-sugar (25 % of the weight of moisture) 8 weight section, (Example 5) The granulated sugar 2 weight section, the 50% fermented milk acid 0.5 weight section, the lemon fruit-juice 1 weight section, The brewing vinegar 4 weight section, the refined salt 1.5 weight section, the succinic-acid disodium crystal 0.01 weight section, the curry powder 2 weight section, the mustard seed powder 0.2 weight section, the powder pepper 0.01 weight section, and the above-mentioned enzyme processing (yolk I) 8 weight section were mixed, and the aqueous phase was prepared. Independently, in the above-mentioned plant sterol fatty-acid-ester content (fats-and-oils I) 30 weight

section, the modified starch 3 weight section, the xanthan gum 0.1 weight section, and the Calais flavor 0.1 weight section which became a paste potato starch after phosphoric-acid bridge formation were distributed and dissolved, and the oil phase was prepared. Subsequently, the above-mentioned oil phase was added stirring the above-mentioned aqueous phase, the oil-in-water type preliminary emulsification object was obtained, this was homogenized by the homogenization pressure force of 20MPa(s) with the homogenizer, and the oil-in-water type emulsification object of this invention was obtained. When this oil-in-water type emulsification object was stirred by Spa Chela after 24-hour refrigeration in the 5-degree C refrigerator, destruction of oil-in-water type emulsification was not seen, but emulsification was stable. Moreover, flavor and mouthfeel of this oil-in-water type emulsification object were good.

[0052] (Example 1 of a comparison) The oil-in-water type emulsification object was obtained like the example 1 except having used the salting yolk 7.5% instead of the enzyme processing yolk (I). When this oil-in-water type emulsification object was stirred by Spa Chela after 24-hour refrigeration in the 5-degree C refrigerator, it was destroyed and the oil separated oil-in-water type emulsification. Moreover, this oil-in-water type emulsification object was what is inferior in flavor and mouthfeel.

[0053] (Example 2 of a comparison) The oil-in-water type emulsification object was obtained like the example 5 except having used the salting yolk 7.5% instead of the enzyme processing yolk (I). When this oil-in-water type emulsification object was stirred by Spa Chela after 24-hour refrigeration in the 5-degree C refrigerator, it was destroyed and the oil separated oil-in-water type emulsification. Moreover, this oil-in-water type emulsification object was what is inferior in flavor and mouthfeel.

[0054] (Example 6) The same processing as an example 2 is performed after dissolving the plant sterol 43 weight section of the soybean origin in the mixture of the heated oleum rapae 19 weight section and the ethyl oleate ester 38 weight section, and it is plant sterol fatty-acid-ester content fats and oils (III). It obtained. These fats and oils (III) Presentations were 76 % of the weight of plant sterol fatty acid ester, 0 % of the weight of monoglycerides, 4 % of the weight of diglycerides, 17 % of the weight of triglycerides, and 3 % of the weight of unreacted plant sterol. These fats and oils (III) The fatty acid composition of plant sterol fatty acid ester, a triglyceride, and diglyceride was shown in the following table 1. Next, it is the above-mentioned plant sterol fatty-acid-ester content fats and oils (III) instead of plant sterol fatty-acid-ester content fats and oils (I). The oil-in-water type emulsification object of this invention was obtained like the example 5 except having used. When this oil-in-water type emulsification object was stirred by Spa Chela after 24-hour refrigeration in the 5-degree C refrigerator, destruction of oil-in-water type emulsification was not seen, but emulsification was stable. Moreover, flavor and mouthfeel of this oil-in-water type emulsification object were good.

[0055]
[Table 1]

(単位：重量%)

	植物ステロール脂肪酸エステル含有油脂		
	(I)	(II)	(III)
トリグリセリドの脂肪酸組成			
C16:0	4	4	1
C18:0	2	2	0
C18:1	59	60	90
C18:2	22	21	6
others	13	13	3
植物ステロール脂肪酸エステルの脂肪酸組成			
C16:0	4	4	1
C18:0	2	2	0
C18:1	57	59	91
C18:2	22	22	5
others	15	13	3
ジグリセリドの脂肪酸組成			
C16:0	4	4	1
C18:0	2	2	0
C18:1	58	60	91
C18:2	22	22	4
others	14	12	4

[0056]
[Effect of the Invention] The oil-in-water type emulsification object of this invention is an oil-in-water type emulsification object containing the plant sterol which has a plasma cholesterol concentration fall function, and/or plant sterol fatty acid ester, and flavor and its mouthfeel are stably [oil-in-water type emulsification] good for a long period of time.

[Translation done.]